

2.6 – Prove Statements about Segments and Angles

Theorem 2.1 – Congruence of Segments

Reflexive: For any segment AB , $\overline{AB} \cong \overline{AB}$

Symmetric: If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$.

Transitive: If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$.

Theorem 2.2 – Congruence of Angles

Reflexive: For any angle A , $\angle A \cong \angle A$

Symmetric: If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.

Transitive: If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

Example 1: Symmetric Property of Segment Congruence

Given: $\overline{PQ} \cong \overline{XY}$

Prove $\overline{XY} \cong \overline{PQ}$

Statements:

1. $\overline{PQ} \cong \overline{XY}$

2. $mPQ = mXY$

3. $mXY = mPQ$

4. $\overline{XY} \cong \overline{PQ}$

Reasons:

1. Given

2. Definition of congruent segments

3. Symmetric Property of Equality

4. Definition of congruent segments

Example 2: Using Congruence

• Use the diagram and the given information to complete the missing steps and reasons in the proof.

• GIVEN: $LK = 5$, $JK = 5$, $\overline{JK} \cong \overline{JL}$

• PROVE: $\overline{LK} \cong \overline{JL}$

1. $LK = 5$

2. $JK = 5$

3. $LK = JK$

4. $\overline{LK} \cong \overline{JK}$

5. $\overline{JK} \cong \overline{JL}$

6. $\overline{LK} \cong \overline{JL}$

1. Given

2. Given

3. Transitive Property

4. DEF. OF CONGRUENT SEGMENTS

5. Given

6. Transitive Property